Vitold Belevitch

Vitold Belevitchs parents were living in Leningrad, that is now again called St Petersburg, the former capital of the Russian Empire. In order to flee from the aftermaths of the communist revolution in 1917, his parents tried in 1921 to get to Helsinki in Finland. Helpers brought his mother, who was expecting her first child, across the border. But before they could also guide his father into safety, he was arrested and deported to Siberia, from where he never returned. So Vitold Belevitch was born in the small Karelian town of Terijoki on 2 March 1921. His mother did not stay there, but went as soon as possible on to Helsinki, where she registered Vitold's birth. Hence he is officially listed as been born in Helsinki. When Vitold was 4 years old, his mother moved with him to Belgium, like did a good number of Russian refugees. There he grew up and got his education in French, even though his language at home continued to be Russian. Vitold Belevitch was a man of broad scientific and cultural interest. He studied electrical and mechanical engineering at the Université Catholique de Louvain, getting his diploma at the age of 21 in 1942. Then he joined Bell Telephone Manufacturing Company (BTMC), now Alcatel-Lucent in Antwerp, Belgium. There he met Cauer who was working for a sister company Mix&Genest in Berlin. Cauer introduced him to the beauty of circuit theory and its applications. Stimulated by Cauer and under the supervision of Charles Manneback, he obtained the doctoral degree in applied sciences from the Université Catholique de Louvain in 1945. In his thesis he introduced the revolutionary concept of the scattering matrix, or repartition matrix, as he called it. In fact, this concept was also independently discovered by American researchers during the Second World War in the context of distributed parameter microwave circuits. Belevitch used it in order to build a comprehensive approach to several results in circuit theory that were initially developed by Brune, Cauer, Foster, Gewertz, Darlington and others. He could extend this concept to any number of ports, and reciprocal as well as non-reciprocal, real as well as complex networks. He even made valuable contributions to the theory of nonlinear circuits with applications for rectifier circuits. The majority of his research on circuits and systems is described in his three impressive books, "Théorie des circuits de télécommunications" and "Thorie des circuits non-linaires en rgime alternatif", both written in French and the third written in English entitled "Classical Network Theory". As the title of the third suggests, this is a monumental work, that goes beyond what was customary. It has since been considered as his most important contribution and a standard work on circuit theory. His publications on filter theory and modulation techniques have since served as regular tools for many engineers in laboratories and development. His reputation in circuit theory was so strong internationally, that he was the only European researcher to be invited to write a contribution on the history of circuit theory for a special issue of the Proceedings of Institute of Radio Engineers (IRE). That special issue was set up in 1962 by IRE, one of the two predecessors of IEEE, to celebrate its 50th birthday.

In 1951 Belgian research funding agencies gave the task to design and build an

electronic computers to Bell Telephone, and Belevitch became the project leader. Nearly everything had to be designed and built by mathematicians, physicists and engineers. Upon completion of this project he left Bell Telephone and became in 1955 director of the Belgian Computing Center, the 'Comité d'étude et d'exploitation des calculateurs électroniques' in Brussels. The computer was finished in 1956. It was 13 meter long and 2,5 meter high, and contained 1000 triodes, 1200 tubes with cold cathode, 400 relays, 1000 selenium diodes, and 500 germanium diodes. All information was encoded in decimal numbers. Although the components were not very reliable, and much heat was produced by the electronic tubes, the machine was operational until the beginning of 60ies. It was free of charge to be used by academic researchers and industry was charged 5000 Belgian Francs per hour (approximately 150 US$). At the request of the director of research of Philips, Prof. Casimir, Belevitch founded in 1963 the Laboratoire de Recherche at MBLE Manufacture Belge de Lampes Electriques, later renamed as Philips Research Laboratories Belgium (PRLB). The research center had in the 80ies around 70 researchers of high caliber. He directed this very successful research center until his retirement at the end of November 1984. About 30 of his former co-workers or former students are now well-known professors at recognized universities around the world. Already in 1953 Vitold Belevitch was also appointed as a part-time professor at the UCL, where he taught subjects like circuit theory, electromagnetism, applied mathematics, information theory and coding. In 1960 he became extraordinary professor there and retired in 1985.

As head of industrial laboratories he was a full-fledged engineer, with attention to practical use, reliability and performance. But he also kept strong fundamental academic research interests, primarily linked to mathematics, with a stronger inclination toward algebra than analysis. In fact the more a problem was mathematically intriguing, the more he was interested in finding a suitable solution. This pronounced orientation towards mathematics is quite typical for research minded Belgian engineers. In Belgium, indeed, for many years a regular high-school diploma does not yet give access to university studies in engineering. One must in addition pass a rather stringent entrance examination involving nothing but mathematics at the most advanced level taught at science-oriented high-school tracks. For Belevitch the mathematical intuition often preceded and guided him to the result even before calculating it. He made major contributions to the fields of information and systems and control theory, the design of electronic computers, mathematics and linguistics. In fact, he was able to speak, and especially to read, an exceptionally large number of languages. He also applied the mathematics of information theory to obtain results on human languages. The total volume of his scientific production is estimated at 4000 pages.

Vitold Belevitch received numerous recognitions for his scientific achievements. He became Fellow of the IEEE, and was awarded the IEEE centennial medal, and in 1993 he received the Society Award of IEEE Circuits and Systems Society, now called the Mac Van Valkenburg Award. In 1975 and 1978, respectively, the Technical University of Munich, Germany, and the Ecole Polytechnique Fédérale de Lausanne, Switzerland, conferred upon him an honorary doctoral degree.

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